

**REMARKS/ARGUMENT**

Claims 1, 3-71, 75-83, 85-87, 89-93, and 95-122 remain pending for further prosecution. Claims 1, 9, 10, 13, 14, 26, 32-34, 42-82, 85, 92, 93, and 95-101 are amended. Claims 102-122 are new. Claims 2, 72-74, 84, 88, and 94 are cancelled.

Support for the claim amendments can be found, for example, in FIGS. 1, 2, 7, 22, 23, 30, 34, and 35, and pages 10-15, 16-18, 38, 39, 56-60, and 67-73 of the originally filed specification. No new matter has been added.

The Decision by the Board affirmed the final rejection of claims 1, 3-87, and 89-101 under 35 U.S.C. § 101 as being directed to non-patentable subject matter. Specifically, it was alleged that the method claims were not a section 101 “process” because they did not include a particular machine, nor did they transform subject matter to a different state or thing. *See* Decision, p. 19. It was further alleged that apparently ineligible mathematical manipulations of data do not become eligible subject matter when the mathematical manipulations of data are stored on a computer readable medium, are displayed, or when input data is obtained using a graphical user interface or stored in a data structure. *See* Decision, pp. 28 and 30-34. Of particular concern to the Board was that a patent on the rejected claims would apparently wholly preempt an abstract idea and in practical effect would apparently be a patent on the algorithm itself, similar to *Gottschalk v. Benson*, 409 U.S. 63, 71-72, 175 USPQ 673, 676 (1972)(stating that, if the judgment below were affirmed, “the patent would wholly preempt the mathematical formula and, in practical effect, would be a patent of the algorithm itself.”)

35 U.S.C. §101 provides that “[w]hoever invents or discovers any new or useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefrom, subject to the conditions and requirements of this Title.” As noted by the Supreme Court in *Diamond v. Diehr* (450 U.S. 175, 182 (1981)) and *Diamond v. Chakrabarty* (447 U.S. 303, 308 (1980)), cases of statutory construction must begin with the statute and, unless otherwise defined, “words will be interpreted as taking their ordinary, contemporary, common meaning.” The Supreme Court acknowledged that the repetitive use of the expansive term “any” in Section 101 to modify yet other expansive terms demonstrated that

“Congress plainly contemplated that the patent laws would be given wide scope” *Diamond v. Chakrabarty*, 447 U.S. 303, 309 [206 USPQ 193] (1980). The Supreme Court in *Diamond v. Chakrabarty* further concluded that “[t]he relevant legislative history also supports a broad construction,” inclusive of Committee Reports accompanying the 1952 Act that clearly show Congress’s intent to “include anything under the sun that is made by man.” 447 U.S. 303, 309; *see also, e.g., Diamond v. Diehr*, 450 U.S. 175, 182 [209 USPQ 1] (1981). The Supreme Court in *Diamond v. Chakrabarty* further stressed that “[t]he subject matter provisions of the patent law have been cast in broad terms to fulfill the constitutional and statutory goal of promoting ‘the Progress of Science and the useful Arts’ with all that means for the social and economic benefits envisioned by Jefferson” 447 U.S. 303, 315. “Congress employed broad general language in drafting §101 precisely because such inventions are often foreseeable” *Id.* at 316.

In its construction of 35 U.S.C. § 101, the Supreme Court has identified three categories of subject matter that are unpatentable, namely “laws of nature, natural phenomena, and abstract ideas.” *See, e.g., Diamond v. Diehr*, 450 U.S. 175, 185. “An idea of itself is not patentable.” *Rubber-Tip Pencil Co. v. Howard* (20 Wall.) 498, 507 (1874). “A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right.” *LeRoy v. Tatham*, (14 How.) 156, 175 (1852).

At issue in *Gottschalk v. Benson*, a case relied upon in the final Office Action and the Decision On Appeal, were claims for converting binary-coded decimal (BCD) numerals into pure binary numerals. As noted by the Court, “[t]he claims were not limited to any particular art or technology, to any particular apparatus or machinery, or to any particular end use” and the question raised was whether the method described and claimed was a process within the meaning of the Patent Act. 409 U. S. 63, 64 (1972). As further noted by the Court, the claims at issue in *Gottschalk v. Benson* “can also be performed without a computer” (*see* 409 U. S. 63, 67) and the Court then went on to state that “[h]ere the ‘process’ claim is so abstract and sweeping as to cover both known and unknown uses of the BCD to pure binary conversion” and that “[t]he end use may (1) vary from the operation of a train to verification of drivers- licenses to researching the law books for precedents *and* (2) be performed through any existing machinery or future-devised machinery *or without any apparatus.*” *See* 409 U. S. 63, 68.

The Court further characterized this conclusion, citing with approval its decision in *Mackay Co. v. Radio Corp.*, 306 U. S. 86, 94 (1939), and emphasizing that “[w]hile a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be.” *Gottschalk v. Benson*, 409 U. S. at 67 (*citing Mackay Co. v. Radio Corp.*, 306 U.S. 86, 94). The Court further noted in response to those who say “that the decision precludes a patent for any program servicing a computer.” “We do not so hold.” *Gottschalk v. Benson*, 409 U. S. at 71 (emphasis added). The Court in *Gottschalk v. Benson* further cited as support the pronouncement of the Court in *LeRoy v. Tatham*, noted above, that “[a] principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right.” 409 U. S. at 67. The Court in *LeRoy v. Tatham* itself expounded on the principle later referred to in *Gottschalk v. Benson* as preemption, stating that “[a] patent is not good for an effect, or the result of a certain process, as that would prohibit all other persons from making the same thing by any means whatsoever.” *See* 55 U.S. 156 at 175.

The Federal Circuit, in *State Street Bank & Trust Company v. Signature Financial Group, Inc.*, held that an invention is deemed to constitute patentable subject matter under 35 U.S.C. § 101 if it involves some practical application and “it produces a useful, concrete and tangible result.” 149 F.3d 1368, 1373 (Fed. Cir. 1998), *cert. denied*, 525 U.S. 1093 (1999). The *State Street Bank* decision framed the question of whether a claim encompasses statutory subject matter as being directed to “the essential characteristics of the subject matter, in particular, its practical utility.” The Supreme Court’s denial of the *writ of certiorari* in *State Street Bank* indicates that the Supreme Court supported the interpretation of 35 U.S.C. § 101 by the Federal Circuit in *State Street Bank*. *State Street Bank* stated that “[u]npatentable mathematical algorithms are identifiable by showing they are merely abstract ideas constituting disembodied concepts or truths that are not ‘useful.’” 149 F.3d at 1373. In the present case, the disclosed subject matter is certainly not disembodied and is certainly useful, as is amply demonstrated in the application disclosure (*see, e.g.*, examples provided regarding application in waveguides).

Thus, in accord with *State Street Bank* and the Supreme Court’s acceptance thereof, the present claims do not constitute “unpatentable mathematical algorithms.” The present claims do

not present an algorithm *in the abstract*, but rather produce a useful, concrete, and tangible result. Accordingly, for at least this reason, the present claims are submitted to constitute patentable subject matter.

Applicants further note that the claims do not lay claim to a principle or prohibit others from developing alternative models achieving the same ultimate ends by other means. Moreover, the presently pending claims are grounded in structure and do not cover use of the disclosed concepts divorced from the recited structure (i.e., the claims do not prohibit manual calculation).

Claims 42, 92, 121, and 122 recite, *inter alia*, an apparatus for producing a model of a combined physical system having physical quantities. A “machine” or “apparatus” is proper statutory subject matter under §101. Claims 1 and 116-118 recite, *inter alia*, using a first physical computing device and a second physical computing device, and thus, are also proper statutory subject matter. *See Ex parte Wasynzuk*, Apeeal 2008-1496, June 2, 2008 (decision allowing claims for a computer-implemented method for simulating operation of a physical system having a plurality of subsystems comprising simulating on a first physical computing device and a second physical computing device). Claim 82 further recites patentable subject matter through its recitation of, *inter alia*, using a processor and outputting to a memory device or a communication device.

“[W]hen a claim containing a mathematical formula implements or applies that formula in a structure or process which, *when considered as a whole*, is performing a function which the patent laws were designed to protect (e.g., transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of §101.” *Diamond v. Diehr*, 450 U.S. 175, 192 (emphasis added).

Applicants respectfully submit that the claims must be considered *as a whole*, within context of the disclosed structural limitations. Applicants submit that the claims set forth subject matter having practical utility and producing a useful, concrete and tangible result, and, properly construed, constitute patentable subject matter under §101. *See, e.g., State Street Bank, supra.*

**CONCLUSION**

Applicants submit that claims 1, 3-71, 75-83, 85-87, 89-93, and 95-122 are in condition for allowance and action toward that is respectfully requested. If there are any matters which may be resolved or clarified through a telephone interview, the Examiner is requested to contact the undersigned attorney at (312) 425-8552.

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A Request for Continued Examination ("RCE") is hereby made and authorization to deduct the RCE fees necessary is hereby granted. Please deduct such fees from Nixon Peabody LLP Deposit Account No. 50-4181, Order No. 801939-000101. It is believed that no additional fees are due other than the RCE fee; however, should any additional fees be required (except for payment of the issue fee), the Commissioner is authorized to deduct the fees from the Nixon Peabody Deposit Account No. 50-4181, Order No. 801939-000101.

Respectfully submitted,

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